

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE**

VOICEAGE EVS LLC,  
Plaintiff,

v.

HMD GLOBAL OY,  
Defendant.

C.A. No. 19-1945-GBW

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**MEMORANDUM OPINION**

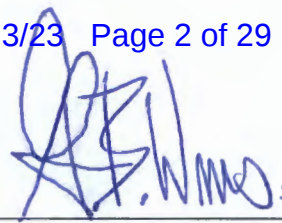
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January 23, 2023  
Wilmington, Delaware



GREGORY B. WILLIAMS  
UNITED STATES DISTRICT JUDGE

In this action filed by Plaintiff VoiceAge EVS LLC (“VoiceAge”) against Defendant HMD Global Oy (“HMD”), VoiceAge alleges infringement of U.S. Patent Nos. 7,693,710 (“the ’710 patent”), 8,401,843 (“the ’843 patent”), 8,990,073 (“the ’073 patent”) and 8,825,475 (“the ’475 patent”), and 9,852,741 (“the ’741 patent”). Before the Court is the issue of claim construction of multiple terms in these patents. The Court has considered the parties’ joint claim construction brief and the accompanying appendix and declarations. D.I. 88, 89, 90, 91. The Court held a claim construction hearing on November 30, 2022.

## **I. LEGAL STANDARDS**

“It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted); *see also Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989) (“A claim in a patent provides the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using, or selling the protected invention”). “[T]here is no magic formula or catechism for conducting claim construction.” *Phillips*, 415 F.3d at 1324. The Court is free to attach the appropriate weight to appropriate sources “in light of the statutes and policies that inform patent law.” *Id.* The ultimate question of the proper construction of a patent is a question of law, although subsidiary fact-finding is sometimes necessary. *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 837 (2015) (quoting *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372 (1996)).

“The words of a claim are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art when read in the context of the specification and

prosecution history.” *Thorner v. Sony Comput. Ent. Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (citing *Phillips*, 415 F.3d at 1312–13). A person of ordinary skill in the art “is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Phillips*, 415 F.3d at 1313.

“When construing claim terms, the court first looks to, and primarily rely on, the intrinsic evidence, including the claims themselves, the specification, and the prosecution history of the patent, which is usually dispositive.” *Sunovion Pharms., Inc. v. Teva Pharms. USA, Inc.*, 731 F.3d 1271, 1276 (Fed. Cir. 2013). “Other claims of the patent in question, both asserted and unasserted, can . . . be valuable” in discerning the meaning of a disputed claim term because “claim terms are normally used consistently throughout the patent,” and so, “the usage of a term in one claim can often illuminate the meaning of the same term in other claims.” *Phillips*, 415 F.3d at 1314. In addition, “[d]ifferences among claims can also be a useful guide[.]” *Id.* For example, “the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.” *Id.* at 1314-15.

In addition to the claim, the Court should analyze the specification, which “is always highly relevant to the claim construction analysis ... [as] it is the single best guide to the meaning of a disputed term.” *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). It is also possible that “the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs.” *Phillips*, 415 F.3d at 1316. “Even when the specification describes only a single embodiment, [however,] the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of

manifest exclusion or restriction.” *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1372 (Fed. Cir. 2014) (internal quotation marks omitted) (quoting *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004)). And, the specification “is not a substitute for, nor can it be used to rewrite, the chosen claim language.” *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004).

The Court “should also consider the patent’s prosecution history, if it is in evidence.” *Markman*, 52 F.3d at 980. The prosecution history “can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution[.]” *Phillips*, 415 F.3d at 1317.

In some cases, the Court “will need to look beyond the patent’s intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period.” *Teva*, 135 S. Ct. at 841. Extrinsic evidence “consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Markman*, 52 F.3d at 980. Overall, while extrinsic evidence may be useful, it is “less significant than the intrinsic record in determining the legally operative meaning of claim language.” *Phillips*, 415 F.3d at 1317 (internal quotation marks and citations omitted).



## II. AGREED-UPON TERMS

The parties agreed upon the construction of ten claim terms as follows:

Claim Term	Agreed-Upon Construction
<p>“A method of concealing frame erasure caused by frames of an encoded sound signal erased during transmission from an encoder to a decoder, comprising”</p> <p>(’710 patent, claim 4)</p>	Preamble is limiting
<p>“A device for conducting concealment of frame erasure caused by frames of an encoded sound signal erased during transmission from an encoder to a decoder, comprising:”</p> <p>(’710 patent, claims 16, 17, 24)</p>	Preamble is limiting
<p>“concealment/recovery parameters selected from the group consisting of a signal classification parameter, an energy information parameter[,] and a phase information parameter”</p> <p>(’710 patent, claims 4, 16, 17, 24)</p>	concealment/recovery parameters that must be selected from the group consisting of a signal classification parameter, an energy information parameter, and a phase information parameter, and cannot include any other concealment/recovery parameters
<p>“A transition mode [device]/[method] for use in a predictive-type sound signal codec for producing a transition mode excitation replacing an adaptive codebook excitation in a transition frame and/or at least one frame following the transition in the sound signal, comprising:”</p> <p>(’843 patent, claims 1, 31)</p>	Preamble is limiting

<p>“An encoder [device]/[method] for generating a transition mode excitation replacing an adaptive codebook excitation in a transition frame and/or at least one frame following the transition in a sound signal, comprising:”</p> <p>(’843 patent, claims 11, 41)</p>	Preamble is limiting
<p>“A [method]/[device] for estimating a tonal stability [tonal stability] of a sound signal using a frequency spectrum of the sound signal, the [method]/[device] comprising:”</p> <p>(’073 patent, claims 1, 30, 31)</p>	Preamble is limiting
<p>“A [method]/[device] for detecting sound activity in a sound signal, wherein the sound signal is classified as one of an inactive sound signal and an active sound signal according to the detected sound activity in the sound signal, the [method]/[device] comprising:”</p> <p>(’073 patent, claims 10, 36)</p>	Preamble is limiting
<p>“tonal stability tonal stability”</p> <p>(’073 patent, claims 10, 20, 30, 31, 36)</p>	tonal stability
<p>“A Code-Excited Linear Prediction (CELP) codebook coding [device]/[method] for encoding sound into first, second, and third sets of encoding parameters, comprising:”</p> <p>(’475 patent, claims 1, 17)</p>	Preamble is limiting
<p>“transformiiii [sic]”</p> <p>(’741 patent, claim 26)</p>	Transform

The Court will adopt these agreed-upon constructions.

### III. DISPUTED TERMS

#### 1. “transmitting” and “transmission from an encoder to a decoder”

<b>Disputed Term</b>	<b>Plaintiff VoiceAge’s Construction</b>	<b>Defendant HMD’s Construction</b>	<b>The Court’s Construction</b>
“transmitting” (’710 patent, claims 4, 16, 17, 24)	Plain and ordinary meaning	transmitting across a communication channel	transmitting over a communication channel
“transmission from an encoder to a decoder” (’710 patent, claims 4, 16, 17, 24)	Plain and ordinary meaning	transmission from an encoder to a decoder across a communication channel	transmission from an encoder to a decoder over a communication channel

Initially, the parties disputed whether “transmitting” and “transmission from an encoder to a decoder” must occur across a communication channel (as HMD contends) or whether those disputed terms can be understood according to their plain and ordinary meaning (as VoiceAge contends). D.I. 88 at 7. During the claim construction hearing, the parties agreed that transmission occurs “over” a communication channel, but dispute whether the claims require the transmission to be received by the decoder. Tr. 38:8-13; 42:13-19; 47:4-9. According to VoiceAge, because the plain and ordinary meaning of “transmitting” is “sending”, the claims are “agnostic to whether data is received.” Tr. 32:2-3; 34:15-22. In response, HMD contends that VoiceAge interprets transmitting to mean “broadcasting towards a communication channel” and that the claims “require some sort of reception by the decoder of concealment parameters” to make sense for the device to work. Tr. 45:22-23; 46:25-47:9.

These terms appear in independent method claim 4 and device claims 16, 17, and 24 of the ’710 patent, as well as in each claim’s preamble. Claim 4 recites:



A method of concealing frame erasure caused by frames of an encoded sound signal erased during **transmission from an encoder to a decoder**, comprising:

- determining, in the encoder, concealment/recovery parameters selected from the group consisting of a signal classification parameter, an energy information parameter, and a phase information parameter related to the sound signal;

- transmitting** to the decoder concealment/recovery parameters determined in the encoder; and

- in the decoder, conducting frame erasure concealment and decoder recovery in response to the received concealment/recovery parameters;

wherein:

- the sound signal is a speech signal;

- determining, in the encoder, concealment/recovery parameters comprises classifying successive frames of the encoded sound signal as unvoiced, unvoiced transition, voiced transition, voiced, or onset; and

- determining concealment/recovery parameters comprises calculating the energy information parameter in relation to a maximum of a signal energy for frames classified as voiced or onset, and calculating the energy information parameter in relation to an average energy per sample for other frames.

'710 patent at cl. 4 (emphasis added). Claim 16 recites:

A device for conducting concealment of frame erasure caused by frames of an encoded sound signal erased during **transmission from an encoder to a decoder**, comprising:

- in the encoder, a determiner of concealment/recovery parameters selected from the group consisting of a signal classification parameter, an energy information parameter and a phase information parameter related to the sound signal; and

- a communication link for **transmitting** to the decoder concealment/recovery parameters determined in the encoder;

wherein:

- the decoder conducts frame erasure concealment and decoder recovery in response to the concealment/recovery parameters received from the encoder;

- the sound signal is a speech signal;

- the determiner of concealment/recovery parameters comprises a classifier of successive frames of the encoded sound signal as unvoiced, unvoiced transition, voiced transition, voiced, or onset; and

- the determiner of concealment/recovery parameters comprises a computer of the energy information parameter in relation to a



maximum of a signal energy for frames classified as voiced or onset, and in relation to an average energy per sample for other frames.

'710 patent at cl. 16 (emphasis added). Claim 17 recites:

A device for conducting concealment of frame erasure caused by frames of an encoded sound signal erased during **transmission from an encoder to a decoder**, comprising:

in the encoder, a determiner of concealment/recovery parameters selected from the group consisting of a signal classification parameter, an energy information parameter and a phase information parameter related to the sound signal; and

a communication link for **transmitting** to the decoder concealment/ recovery parameters determined in the encoder;

wherein:

the decoder conducts frame erasure concealment and decoder recovery in response to concealment/recovery parameters received from the encoder; and

for conducting frame erasure concealment and decoder recovery:

the decoder controls an energy of a synthesized sound signal produced by the decoder by scaling the synthesized sound signal to render an energy of said synthesized sound signal at the beginning of a first non erased frame received following frame erasure similar to an energy of said synthesized sound signal at the end of a last frame erased during said frame erasure; and

the decoder converges the energy of the synthesized sound signal in the received first non erased frame to an energy corresponding to the received energy information parameter toward the end of said received first non erased frame while limiting an increase in energy.

'710 patent at cl. 17 (emphasis added). Claim 24 recites:

A device for conducting concealment of frame erasure caused by frames of an encoded sound signal erased during **transmission from an encoder to a decoder**, comprising:

in the encoder, a determiner of concealment/recovery parameters selected from the group consisting of a signal classification parameter, an energy information parameter and a phase information parameter related to the sound signal; and

a communication link for **transmitting** to the decoder concealment/ recovery parameters determined in the encoder;

wherein:

the sound signal is a speech signal;

the determiner of concealment/recovery parameters comprises a classifier of successive frames of the encoded sound signal as unvoiced, unvoiced transition, voiced transition, voiced, or onset; and  
 the determiner of concealment/recovery parameters comprises a computer of the energy information parameter in relation to a maximum of a signal energy for frames classified as voiced or onset, and in relation to an average energy per sample for other frames.

'710 patent at cl. 24 (emphasis added).

Starting with the claims, in each instance, “transmission” refers to transmission of “an encoded sound signal” “from an encoder to a decoder.” ’710 patent at cl. 4, 16, 17, 24. Further, “transmitting” appears in every asserted independent claim in the context of transmitting “concealment/recovery parameters” to the decoder from the encoder. ’710 patent at cls. 1-5, 8, 10-11, 13-17, 20, 22-24. Thus, the claims on their face contemplate the decoder as the destination for the concealment/recovery parameters. The claims do not, for example, recite a transmission from an encoder without identifying the transmission’s destination—here, the decoder.

Turning to the specification, the present invention is described as “relat[ing] to robust encoding and decoding of sound signals to maintain good performance in case of erased frame(s) due, for example, to channel errors in wireless systems or lost packets in voice over packet network applications.” ’710 patent at 1:21-25. The illustrative embodiments describe a “speech communication system depicting the use of speech encoding and decoding” that “supports transmission of a speech signal across a communication channel.” ’710 patent at 4:19-27. Indeed, the specification only describes transmitting an encoded sound signal to a decoder “over a communication channel.” ’710 patent at 1:45-53 (“A speech encoder converts a speech signal into a digital bit stream which is transmitted over a communication channel or stored in a storage medium. . . . The speech decoder or synthesizer operates on the transmitted . . . bit stream and

converts it back to a sound signal.”); 4:27-29 (“The speech communication system . . . supports transmission of a speech signal across a communication channel . . .”). Thus, the intrinsic record supports a construction that contemplates a transmission occurring over a communication channel.

VoiceAge points to one instance in the specification to argue that “transmitting” need not occur “across a communication channel” because “the inventors used the word ‘transmitted’ to refer to conveying information from the encoder to a multiplexer.” D.I. 88 at 10 (citing ’710 patent at 7:66-8:1 (“The pitch codebook index T is encoded and transmitted to the multiplexer . . . for transmission through a communication channel.”). That example, however, does not involve “transmission” of the “encoded sound signal” from an encoder to a decoder” (’710 patent at cl. 4, 16, 17, 24) or transmitting “concealment/recovery parameters” to the decoder from the encoder (’710 patent at cls. 1-5, 8, 10-11, 13-17, 20, 22-24) as set forth in the claim language.

VoiceAge also contends that HMD’s construction requiring “transmission from an encoder to a decoder” to occur “across a communication channel” implicitly requires signals transmitted “to” a decoder to be received—a limitation VoiceAge describes as improper because a “transmitted” signal “need not traverse the entire path between a transmitter and a receiver.” D.I. 88 at 9; *Id.* (“Indeed, the written description and the claims acknowledge that signals transmitted ‘to’ a decoder need not be received.”). However, as described *supra*, the claims contemplate a destination for the signals—the decoder. Further, the specification consistently describes frame erasure concealment as occurring upon receipt of the signal by the decoder. *See, e.g.*, ’710 patent at 2:58-63 (“The present invention relates to a method for improving concealment of frame erasure caused by frames of an encoded sound signal erased during transmission from an encoder to a decoder, and for accelerating recovery of the decoder after non erased frames of the encoded sound signal have been received . . .”); *id.* at 3:4-9 (“The present invention also relates to . . . accelerating



recovery of the decoder after non erased frames of the encoded sound signal have been received”). Indeed, the parties agree that at least some frames sent out by the encoder are received by the decoder. Tr. 44:21-22; 48:19-22.

The Court, however, declines to import a limitation into the claims requiring all concealment/recovery parameters to be received by the decoder. While HMD contends that “if the decoder does not receive concealment/recovery parameters that are transmitted from the encoder, then frame erasure concealment does not occur . . . and the claimed method would not occur at all,” Tr. 45:15-19, the Federal Circuit has stated that “the claims need not recite every component necessary to enable operation of a working device.” *Markem-Imaje Corp. v. Zipher Ltd.*, 657 F.3d 1293, 1300–01 (Fed. Cir. 2011) (quoting *Rambus Inc. v. Infineon Tech. AG*, 318 F.3d 1081, 1093 (Fed. Cir. 2003)) (“That a device will only operate if certain elements are included is not grounds to incorporate those elements into the construction of the claims. A claim to an engine providing motive power to a car should not be construed to incorporate a limitation for an exhaust pipe, though an engine may not function without one. Thus, though “some method of deriving a tension measurement” may be required to make a claimed device operational, it is not proper to incorporate that method into the claim construction.”). Here, the claims, as a matter of their construction, require the transmission of concealment/recovery parameters to travel over a communications channel, but not more.

Accordingly, at this stage,<sup>1</sup> the Court construes “transmitting” as “transmitting over a communication channel” and “transmission from an encoder to a decoder” as “transmission from an encoder to a decoder over a communication channel.”

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<sup>1</sup> “[C]laim construction is rolling and it is within the Court’s discretion to clarify and revise claim constructions at any point before the case goes to the jury.” *Dali Wireless, Inc. v.*

## 2. “communication link”

Disputed Term	Plaintiff VoiceAge’s Construction	Defendant HMD’s Construction	The Court’s Construction
“communication link”  (’710 patent, claims 16, 17, 24)	a portion of a communication channel	a connection between two devices across a communication channel  In the alternative, indefinite. <sup>2</sup>	a connection between two devices over a communication channel

The parties dispute whether a “communication link” requires an end-to-end connection between two devices across a communication channel (as HMD contends) or whether “communication link” simply means a portion of a communication channel, such as a fiber optic or wire link (as VoiceAge contends). D.I. 88 at 25.

Starting with the claims, “communication link” appears in independent claims 16, 17, and 24 of the ’710 patent, each of which recite: “a communication link for transmitting to the decoder concealment/recovery parameters determined in the encoder.” ’710 patent at cls. 16, 17, 24. Claims 16 and 17 further recite “a communication link for transmitting to the decoder . . . parameters determined in the encoder; wherein: the decoder conducts . . . concealment . . . in response to [] parameters received from the encoder.” ’710 patent at cls. 16, 17. Thus, on their face, the claims contemplate that a “communication link” facilitates a connection between two points.

While the specification does not use the term “communication link” (the term was introduced as a claim amendment without explanation, *see* D.I. 89-1 at JA0758-59, JA0761-64),

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*CommScope Techs. LLC*, C.A. No. 19-952 (MN), 2022 WL 621547, at \*5 n.2 (D. Del. Mar. 3, 2022).

<sup>2</sup> As HMD did not brief its position on indefiniteness in the Joint Claim Construction Brief, the Court will not consider it.



the specification (as shown in Figure 1) describes a “communication channel” that the parties agree is “a connection between a transmitting device (e.g., a mobile phone that transmits an encoded sound signal) and a receiving device (e.g., a mobile phone that receives an encoded sound signal).” D.I. 88 at 26-27, 29. That is, a speech signal travels from the channel encoder, through the communications channel, to the channel decoder.

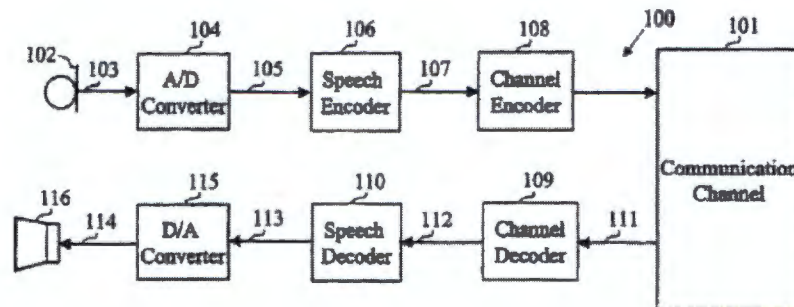


FIG. 1

The specification further describes that the “communication channel” may be comprised of “a wire, an optical link or a fiber link, [and] . . . at least in part a radio frequency link.” ’710 patent at 4:25-35.

VoiceAge, focusing on the specification’s use of the word “link” and the phrase “at least in part”, argues that a “communication link” must, therefore, be a portion of a communication channel; “otherwise, reference to a radio frequency *link* comprising *a part* of the communication channel would not make sense.” D.I. 88 at 34; Tr. 51:11-13 (“This ‘at least in part’ suggesting that it can be multiple links and multiple types of medium, so wire, optical, fiber, or radiofrequency.”). However, while the wire, optical, fiber, and radio-frequency links may each be “a portion of a communication channel,” the intrinsic record suggests that a “communication link” is broader, referring to what connects the two devices across the entire “channel.” For example, the



specification, by disclosing that a storage device can replace the communications channel, suggests that a “communications link” encompasses more than just the wire, optical, fiber, and radio-frequency links comprising the communications channel. *See* ’710 patent at 4:35-39 (“Although not shown, the communication channel . . . may be replaced by a storage device in a single device embodiment of the system . . . that records and stores the encoded speech signal for later playback.”). This disclosure suggests that a “communications link” is not simply a portion of the communications channel.

Further, that a skilled artisan would understand “communications link” to require a connection between two points is reinforced by extrinsic evidence contemporary to the ’710 patent’s May 31, 2002 filing date.<sup>3</sup> The Dictionary of Communications Technology (3<sup>rd</sup> Ed., 1998) defines “communication link” as “[t]he software and hardware, to include cables, connectors, converters, etc., required for two devices such as a computer and terminal to communicate.” *See* D.I. 89-1 at JA0409. The IBM Dictionary of Computing (10<sup>th</sup> ed., 1993) defines “communication link” as synonymous with “data link”, which is “(1) The assembly of parts of two data terminal equipment that are controlled by a link protocol, and the interconnecting data circuit, that enable data to be transferred from a data source to a data sink . . . [and] (2) The interconnecting data circuit and the link protocol between two or more equipments . . . A data link includes the physical medium of transmission, the protocol, and associated devices and programs – it is both logical and physical.” D.I. 89-1 at JA0420.

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<sup>3</sup> *See Sanofi-Aventis U.S. LLC v. Eli Lilly & Co.*, C.A. No. 14-113-RGA-MPT, 2015 WL 1925920, at \*1 (D. Del. Apr. 27, 2015) (“The ’652 patent has an effective filing date of June 18, 2002, which is the relevant time period for purposes of claim construction.”).

These definitions comport with a declaration submitted by HMD's expert, who opines that "[A] skilled artisan would have understood that the terms 'communication channel' and 'communication link' are related, but distinct. A 'communication channel' would be understood to consist of the hardware connections between the encoder and decoder (e.g., the structures forming the pipeline), and a 'communication link' would be understood to comprise the software and hardware between the encoder and decoder (e.g., to enable the handshake between the two)." D.I. 90 ¶ 33. While VoiceAge's expert opines that "a POSITA would understand that each of those examples in the '710 Patent, a wire, an optical link, a fiber link, or a radio frequency link could be considered a communication link," D.I. 91 ¶ 63, he does not opine that a skilled artisan would limit communication link to those examples, as VoiceAge's construction does by confining a "communication link" to a "portion of the communications channel."

Accordingly, the Court will construe "communication link" to be "a connection between two devices over a communication channel."<sup>4</sup>

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<sup>4</sup> To maintain consistency with the Court's earlier construction of the transmitting/transmission terms, *supra* at 6-11, the Court uses the word "over" instead of "across" in construing "communication link." See *Integrated Claims Sys., LLC v. Travelers Indem. Co.*, 758 F. App'x 965, 967 (Fed. Cir. 2019) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc); *Gillespie v. Dywidag Systems Intern., USA*, 501 F.3d 1285, 1291 (Fed. Cir. 2007)).



### 3. “a signal classification parameter”

Disputed Term	Plaintiff VoiceAge’s Construction	Defendant HMD’s Construction	The Court’s Construction
<p>“a signal classification parameter”</p> <p>(’710 patent, claims 4, 16, 17, 24)</p>	<p>a parameter used to determine frame classification</p>	<p>a parameter used to determine frame classification, for example, a normalized correlation, a spectral tilt measure, a signal to noise ratio, a pitch stability counter, a relative frame energy of the signal at the end of the current frame, and a zero-crossing counter</p>	<p>a parameter used to determine frame classification that is different from the frame classification itself</p>

While the parties agree that “a signal classification parameter” is a “parameter used to determine frame classification,” D.I. 88 at 40, HMD’s construction includes an exemplary list of such parameters, an addition VoiceAge characterizes as improperly narrowing, “unnecessary and confusing.” *Id.* at 40-41. The parties further dispute whether the terms “frame classification” and “signal classification” may be used interchangeably when referring to the claimed concealment/recovery parameters. *Id.* at 53, 55-56

Starting with the claims, claim 4 recites that the “signal classification parameter” is one of three concealment/recovery parameters determined in the encoder. *See* ’710 patent at 31:39-43 (“determining, in the encoder, concealment/recovery parameters selected from the group consisting of a signal classification parameter, an energy information parameter, and a phase information parameter related to the sound signal”). Claim 4 further recites “wherein: . . . determining, in the encoder, concealment/recovery parameters comprises classifying successive frames of the encoded sound signal as unvoiced, unvoiced transition, voiced transition, voiced, or onset.” *Id.* at 31:49-54.). Claims 16 and 24 recite that “the determiner of concealment/recovery parameters comprises a classifier of successive frames of the encoded sound signal as unvoiced,



unvoiced transition, voiced transition, voiced, or onset.” ’710 patent at 36:9-12, 38:42-45. Thus, the language of the claims suggests, as the parties agree, that the “signal classification parameter” is used to determine the frame classes later enumerated in the claim itself. The claims further suggest, and the parties do not dispute, that that “signal classification parameter” and “frame classes” are distinct from each other. *See, e.g.*, ’710 patent at cl. 16 (“in the encoder, a determiner of concealment/recovery parameters selected from the group consisting of a signal classification parameter, an energy information parameter and a phase information parameter related to the sound signal; and . . . wherein . . . the determiner of concealment/recovery parameters comprises a classifier of successive frames of the encoded sound signal as unvoiced, unvoiced transition, voiced transition, voiced, or onset . . .”); Tr. 72:24-73:1; 74:3-9; 75:1-8.

Turning to the specification, an illustrative embodiment described in Tables 2 and 3 draw a distinction between “Signal Classification Parameters” and “Frame Class[es]”:

TABLE 2				TABLE 3		
Signal Classification Parameters and the coefficients of their respective scaling functions				Signal Classification Rules at the Encoder		
Parameter	Meaning	$k_p$	$c_p$	Previous Frame Class	Rule	Current Frame Class
$\bar{r}_x$	Normalized Correlation	2.857	-1.286	ONSET	$f_m = 0.66$	VOICED
$\bar{e}_t$	Spectral Tilt	0.04167	0	VOICED		
snr	Signal to Noise Ratio	0.1111	-0.3333	VOICED		
pc	Pitch Stability counter	-0.07143	1.857	VOICED		
$E_p$	Relative Frame Energy	0.05	0.45	TRANSITION	$0.66 > f_m = 0.49$	VOICED
zc	Zero Crossing Counter	-0.04	2.4	TRANSITION	$f_m < 0.49$	TRANSITION
				UNVOICED	$f_m > 0.63$	UNVOICED
				TRANSITION		ONSET
				UNVOICED	$0.63 = f_m > 0.585$	UNVOICED
					$f_m = 0.585$	TRANSITION
						UNVOICED

The specification goes on to explain that the signal classification parameters are fed as inputs to a “merit function” and used to calculate the frame class. *See* ’710 patent at 19:14-24 (“The merit function has been defined as:

$$f_m = \frac{1}{7}(2 \cdot \bar{r}_x^s + \bar{e}_t^s + snr^s + pc^s + E_p^s + zc^s)$$

where the superscript *s* indicates the scaled version of the parameters. The classification is then done using the merit function and following the rules summarized in Table 3”). Thus, the claims and specification favor a construction distinguishing between “a signal classification parameter” and a “frame class.” Indeed, the parties during the claim construction hearing agreed that “a signal classification parameter” is a parameter used to determine frame classification that is different from frame classification. Tr. 72:24-73:1; 74:3-9; 75:1-8.

HMD, however, proposes the Court go further by incorporating in its construction an exemplary list of signal classification parameters borrowed from Table 2. During prosecution, the examiner understood “signal classification parameter” as not limited to HMD’s exemplary parameters. *See* D.I. 89-2 at JA0701 (“[The prior art] teaches a method and apparatus for hybrid coding of speech, where a speech classifier/pitch/voicing (CPV) module 18 classifies speech as stationary unvoiced, steady-state voiced (harmonic), or transition speech. Classification data 42, pitch data 44, and voicing data 46 are sent to multiplexer 48 for transmission over data channel 56 to a decoder . . . Thus, [the prior art] teaches at least ‘a signal classification parameter’.”).<sup>5</sup> Accordingly, the Court declines to narrow “signal classification parameter” beyond explaining that “frame classification” and “signal classification” are different from each other.

The Court also declines VoiceAge’s invitation to rely on an embodiment and define “frame classification” and “signal classification” as “interchangeabl[e]” when referring to the concealment/recovery parameters. D.I. 88 at 52; *compare* ’710 patent at 12:13-20 (explaining that the concealment/recovery parameters “include two or more of the following: frame classification,

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<sup>5</sup> The prior art reference upon which the examiner relied distinguished between parameters used to determine the signal classification and the signal classification itself. *Compare* JA0194 at 18:38-39 (“a set of parameters as input features for the classification”); *with* JA0195 at 19:4-6 (an “output ... [that] indicates the class.”).



energy, voicing information, and phase information.”), *with* ’710 patent at 12:52-55 (describing how “[i]n the present illustrative embodiment, these [concealment/recovery] parameters include signal classification, energy, and phase information[.]”). Even if a “frame” or “signal” classification served as a concealment/recovery parameter in one disclosed embodiment, “every claim does not need to cover every embodiment.” *Pacing Techs., LLC v. Garmin Int’l, Inc.*, 778 F.3d 1021, 1026 (Fed. Cir. 2015) (“Just because an embodiment does not expressly disclose a feature does not mean that embodiment excludes that feature”).

Thus, consistent with the parties’ agreement that “a signal classification parameter” is a parameter used to determine frame classification that is different from frame classification, Tr. 72:24-73:1; 74:3-9; 75:1-8, the Court construes “a signal classification parameter” as “a parameter used to determine frame classification that is different from the frame classification itself.”

#### 4. “classifier”

Disputed Term	Plaintiff VoiceAge’s Construction	Defendant HMD’s Construction	The Court’s Construction
“classifier”  (’710 patent, claims 16, 18, 19, 24)	Plain and ordinary meaning (and not governed by § 112, ¶ 6)	Means-plus-function (governed by § 112, ¶ 6)  <u>Function</u> : classifying successive frames of the encoded sound signal as unvoiced, unvoiced transition, voiced transition, voiced, or onset  <u>Structure</u> : no corresponding structure, material, or acts described in the specification. Indefinite.	device for making a classification (not governed by § 112, ¶ 6)



VoiceAge argues that “classifier” should be afforded its plain and ordinary meaning which is a “module” that “takes information about a sound signal and then classifies it according to some set of rules, and the output, then, is an information about that class or information that is used to determine that class.” Tr. 76:18-21. HMD argues that “classifier” is a means-plus-function term governed by 35 U.S.C. § 112, ¶ 6. D.I. 88 at 63.

Means-plus-function claiming permits a patentee to express an element of a claim as a means for performing a specified function, 35 U.S.C. § 112, ¶ 6, and applies consistent with the following analysis:

The means-plus-function analysis asks two questions. First: Is the disputed claim limitation drafted in means-plus-function format? Second, if and only if the answer to the first question is “yes”: What, if any, is the structure corresponding to the claimed function? . . . Because invoking § 112 ¶ 6 is typically a choice left to the claim drafter, we presume at the first step of the analysis that a claim limitation is subject to § 112 ¶ 6 when the claim language includes the term “means.” The inverse is also true—we presume that a claim limitation is not drafted in means-plus-function format in the absence of the term “means.” We have made clear, however, that this presumption is rebuttable. The presumption can be overcome if a challenger demonstrates that the claim term fails to recite sufficiently definite structure. We have also held that nonce words that reflect nothing more than verbal constructs may be used in a claim in a manner that is tantamount to using the word “means,” and can invoke § 112 ¶ 6. We have emphasized that the essential inquiry is not merely the presence or absence of the word “means,” but whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure. What is important is . . . that the term, as the name for structure, has a reasonably well understood meaning in the art.

*Dyfan, LLC v. Target Corp.*, 28 F.4th 1360, 1365, 1367 (Fed. Cir. 2022) (internal citations and quotation marks omitted).

Here, “classifier” appears in claims 16, 18, 19, and 24 and is not accompanied by the word “means.” For example, Claim 16 recites “the determiner of concealment/recovery parameters comprises a classifier of successive frames of the encoded sound signal as unvoiced, unvoiced

transition, voiced transition, voiced, or onset.” Indeed, during prosecution, the applicants amended the claims to replace “means for classifying” language with a “classifier.” See D.I. 89 at JA0078-96. Accordingly, due to the absence of “means” in the claims, the Court presumes that § 112 ¶ 6 does not apply, a presumption that is HMD’s burden to overcome. *Dyfan*, 28 F.4th at 1367.

To rebut this presumption, HMD relies upon the language of Claim 16 to argue that the term itself is devoid of structure, Tr. 80:16-17 (“And I think that we have satisfied our burden in that sense just by looking at the claim language.”), notes that the specification does not use the term “classifier,” D.I. 88 at 73, and characterizes the prosecution history as “dispositive,” *id.* at 73; *id.* at 64 (“Replacing the term ‘means for classifying’ with the term ‘a classifier’ does not connote any more structure than the means element it replaced.”). But these arguments do not permit the Court to conclude that HMD has demonstrated, by a preponderance of the evidence, that a person of ordinary skill in the art would not have understood “classifier” to connote structure “in light of the claim as a whole.” *Apex Inc. v. Raritan Comput., Inc.*, 325 F.3d 1364, 1372-73 (Fed. Cir. 2003).<sup>6</sup> While HMD interprets the intrinsic record to favor means-plus-function claiming, the prior art cited on the face of the ’710 patent contains examples of “classifiers” in the context of classifying sound signals, suggesting that “classifier” had a structural definition generally known in the speech encoding art. See *Dyfan*, 28 F.4th at 1366 (“Structure can be recited in various ways, including through the use of ‘a claim term with a structural definition that is either provided in the specification or generally known in the art,’ or a description of the claim limitation’s operation and ‘how the function is achieved in the context of the invention.’”) (quoting *Apple Inc. v.*

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<sup>6</sup> “From a procedural standpoint, this presumption imposes on [the party challenging the presumption] the burden of going forward with evidence to rebut . . . the presumption” by showing that a person of ordinary skill in the art “believes the term does not recite sufficiently definite structure.” *Apex*, 325 F.3d at 1373.



*Motorola, Inc.*, 757 F.3d 1286, 1299 (Fed. Cir. 2014)); *see, e.g.*, D.I. 89 at JA0192 (U.S. Patent No. 6,233,550 to Gersho, et al.) at 13:22-25, 33:23-25, 33:49-51, 34:8-10, 38:43-45) (suggesting that “speech classifier” of U.S. Patent No. 6,233,550 classified sound signals as stationary unvoiced, steady-state voiced, or transition). Thus, HMD’s interpretation of the intrinsic record does not satisfy its evidentiary burden.

Turning to the extrinsic record, HMD offers no expert testimony that a skilled artisan would not have understood “classifier” to connote structure. While HMD cites to a contemporaneous definition of “classifier”, that definition (to the extent it is even relevant)<sup>7</sup> suggests that “classifier” connotes some structure. *See* D.I. 89-1 at JA0447 (IEEE: The Authoritative Dictionary of IEEE Standards Terms, 7<sup>th</sup> ed., 2000) (“classifier *See*: decision rule”); D.I. 89-1 at JA0448 (“decision rule A rule or algorithm used in pattern classification to assign an observed unit of image data to a pattern class based on features extracted from the image. *Synonym*: classifier.”).

Therefore, “[i]n the absence of any more compelling evidence of the understanding of one of ordinary skill in the art, the presumption that § 112, ¶ 6 does not apply is determinative.” *Apex*, 325 F.3d at 1373; *see also Zeroclick, LLC v. Apple Inc.*, 891 F.3d 1003, 1007–08 (Fed. Cir. 2018) (finding that “the presumption against the application of § 112, ¶ 6 to the disputed limitations remained unrebutted” because challenger failed to carry its evidentiary burden); *Personalized Media Commc’ns, LLC v. Int’l Trade Comm’n*, 161 F.3d 696, 702–04 (Fed. Cir. 1998) (stating that “[w]hether certain claim language invokes 35 U.S.C. § 112, ¶ 6 is an exercise in claim construction” and that the presumption that § 112, ¶ 6 does not apply “can be rebutted if the evidence intrinsic to the patent and any relevant extrinsic evidence so warrant”). Because HMD

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<sup>7</sup> The cited definition appears to arise in the image processing context, not in the speech encoding art, rendering its applicability suspect.



has not rebutted the presumption, the Court will apply the plain and ordinary meaning to “classifier,” which is a “device for making a classification.”

### 5. “switches”

Disputed Term	Plaintiff VoiceAge’s Construction	Defendant HMD’s Construction	The Court’s Construction
“switches” (’475 patent, claims 1, 3, 9, 11)	Plain and ordinary meaning	devices for making and breaking the connection in an electric circuit	device or program for making a selection

The parties dispute whether the plain and ordinary meaning of “switches” as understood by a person of ordinary skill in the art is directed to hardware and software (as VoiceAge contends) or hardware alone (as HMD contends). Tr. 86:11-12; 93:2-3.

Starting with the claim language, claim 1 recites “switches” that are in either a “first position” or a “second position” to dictate the flow path of the signal:

A Code-Excited Linear Prediction (CELP) codebook coding device for encoding sound into first, second, and third sets of encoding parameters, comprising:

...

a selector of an order of the CELP innovative codebook stage and the transform-domain codebook stage . . . wherein the selector comprises switches having a first position where the CELP innovative codebook stage is first and followed by the transform-domain codebook stage and a second position where the transform-domain codebook stage is first and followed by the CELP innovative codebook stage, and wherein:

in the first position of the switches, the second calculator determines the second target signal using the first target signal and information from the CELP adaptive codebook stage and the third calculator determines the third target signal using the second target signal and information from the CELP innovative codebook stage; and

in the second position of the switches, the third calculator determines the third target signal using the first target signal

and information from the CELP adaptive codebook stage and the second calculator determines the second target signal using the first target signal and information from the CELP adaptive codebook stage and the transform-domain codebook stage,

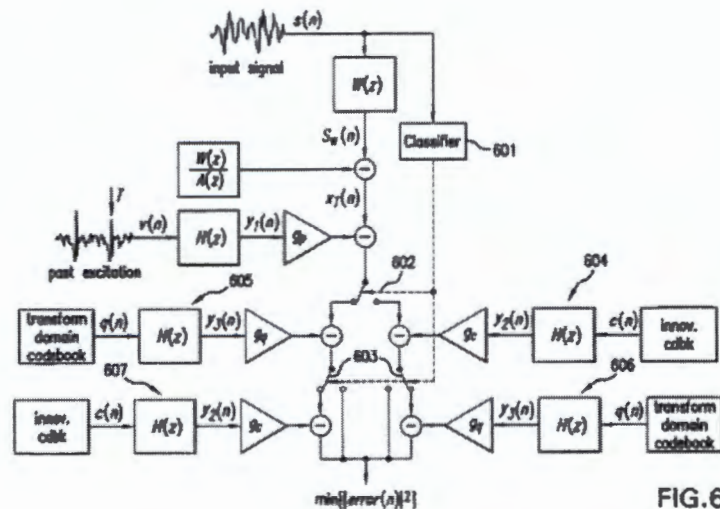
'475 patent at cl. 1 (emphasis added). HMD contends that by "electing to use the term 'switches' with 'discreet positions,' this is found in the claim itself, [VoiceAge] ha[s] narrowed the term to 'hardware switches.'" Tr. 92:12-18 ("They have used the word in a particular way that limits this to hardware by electing to use the term 'switch.'"). But the claims do not use the term "hardware switches." Indeed, the claims are silent as to whether the claimed switching and related positionality occurs in software and hardware, or hardware alone. While HMD argues that VoiceAge has "narrowed" the term "switches" to hardware alone, HMD does not argue disavowal of claim scope. *See Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) ("We depart from the plain and ordinary meaning of claim terms based on the specification in only two instances: lexicography and disavowal."). Accordingly, the claim language does not favor HMD's position.

Turning to the specification, which does not define the disputed term, "switch" is used when describing an embodiment without confining its implementation to hardware:

The output of the classifier 601 is used to drive a first switch 602 which determines if the second codebook stage after the adaptive codebook stage is ACELP coding 604 or transform-domain (TD) coding 605. Further, a second switch 603 also driven by the output of the classifier 601 determines if the second ACELP stage 604 is followed by a TD stage or if the second TD stage 605 is followed by an ACELP stage 607. Moreover, the classifier 601 may operate the second switch 603 in relation to an active or inactive speech frame and a bit rate of the codec using the modified CELP model, so that no further stage follows the second ACELP stage 604 or second TD stage 605.



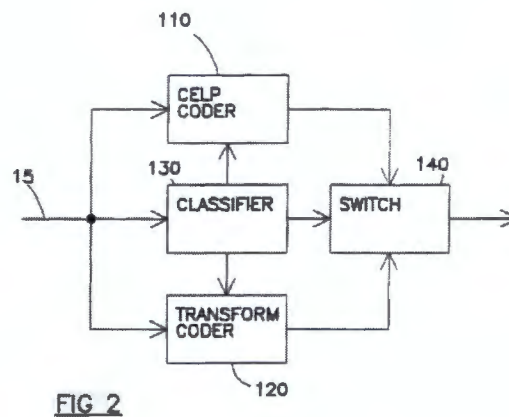
'475 patent at 13:15-30. The embodiment is further described in Figure 6, representing a “a schematic block diagram of an example of general, modified CELP coder with a classifier for choosing between different codebook structures.” '475 patent at 2:27. Specifically, Figure 6 depicts how the described switches 602 and 603 occupy one of two positions using a diagram:



To argue that a person of ordinary skill in the art would interpret Figure 6 to represent an electrical switch implemented in hardware, HMD and its expert rely on a document published by the U.S. Nuclear Regulatory Commission (NRC) titled “Typical Electrical Drawing Symbols and Conventions” that purports to symbolize a hardware switch using the same symbol used in switches 602 and 603. D.I. 88 at 81. But the NRC document, as VoiceAge’s expert explains, “depict[s] symbols typically used in electrical circuit diagrams,” not in the schematic block diagram used in Figure 6. D.I. 91 ¶¶ 41-47. According to VoiceAge’s expert, “A schematic block diagram as used here would typically not depict electrical currents or electrical circuits like the NRC document.” D.I. 91 ¶ 43. As result, the Court cannot join HMD and interpret Figure 6 as confining the claimed “switches” to hardware.



Rather, the specification lends support to VoiceAge's view that a "switch" or "switches" may encompass both software and hardware. The '475 patent cites to U.S. Patent No. 6,134,518 ("Cohen"), '475 patent at (56), which is titled "Digital Audio Signal Coding Using a CELP Coder and Transform Coder," D.I. 89-1 at JA0394. Cohen discloses a "switch" as item 140 in its Figure 2:



D.I. 89-1 at JA0396. In describing the switching functionality, Cohen discloses that, "The selection decision is transferred from the classifier 130 to both coders 110 and 120 and to switch circuit 140, in order to enable one coder and disable the other. The switching takes place at frame boundaries. Switch 140 transfers the selected coder output as output signal 150, and provides for smooth transition upon switching." *Id.* at JA0401. Cohen further states that "It will be understood that the above described coding system may be implemented as either software or hardware or any combination of the two." *Id.* at JA0404. Thus, the "switch" in Cohen contemplated both software and hardware functionality. Although HMD argues that Cohen's use of the term "switch circuit" is a "nod to hardware," D.I. 88 at 86, nowhere does Cohen confine "switch" or "switch circuit" to hardware. At a minimum, therefore, the specification suggests that a skilled artisan would not have understood "switch" to exclude functionality in software.

Turning to the extrinsic record, contemporaneous speech encoders and decoders and accompanying switching functionality appear to have been implemented in software. *See* D.I. 89-2 at JA0607 (Speech Coding Algorithms (2003) (describing how “[a] speech coder is generally specified as an algorithm, which is defined as a computational procedure that takes some input values to produce some output values.”)). VoiceAge’s expert buttresses the notion of software switching functionality, opining that “even if a part of a coder were hardware, it would be relatively unlikely that switches would be hardware.” D.I. 91 ¶ 58.<sup>8</sup> While HMD argues that the claimed positionality of the “switch” cannot occur in software, D.I. 88 at 79 (“Software simulations of a switch cannot have first and second positions, as claimed.”), that statement is bereft of any citation. Indeed, HMD’s expert does not opine that the claimed positionality cannot occur in software. *See generally* D.I. 90.

VoiceAge’s expert further explains that, because “command line switches” occur in programming language, “switch” may refer to “a programmatic/software construct rather than a purely hardware based one.” D.I. 91 ¶¶ 48-54. Contemporaneous dictionaries confirm this view. While HMD cites dictionaries describing a “switch” as a hardware device, *id.* at 84, VoiceAge

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<sup>8</sup> “This is because (as with Fig. 6 of the ’475 Patent) the bulk of different types of coders are implemented in software. When a hardware piece is added to a software implementation, that requires difficult translation from software to hardware. POSITAs would only make that translation if the effort was compensated for with a significant speed-up of the coder. But, software switches are fast—they typically require on the order of ten or 100 clock cycles to perform. Accordingly, as 10 or 100 clock cycles is a very short amount of time, there would be very little advantage to be obtained in converting a software switch to a hardware switch. For this additional reason, a POSITA would expect switches in voice encoders at the time of the invention of the ’475 Patent to be software switches, not hardware switches. At a minimum, a POSITA would not expect switches in voice encoders at the time of the invention of the ’475 Patent to be solely implemented in hardware.” D.I. 91 ¶ 58.

cites a dictionary defining “switch” as “[a] device or programming technique for making a selection; for example, a toggle, a conditional jump.” D.I. 88 at 76.

In sum, the intrinsic and extrinsic record suggests that a skilled artisan would have not understood “switches” in the context of the ’475 patent to be limited to hardware. Even if the Court were to agree with HMD that the instant dispute is one of “poor claim drafting,” Tr. 92:12-13, “[i]t is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Phillips*, 415 F.3d at 1312.

Accordingly, the Court construes “switch” according to its plain meaning, which is a “device or program for making a selection.”

#### **IV. CONCLUSION**

The Court will adopt the parties’ agreed-upon constructions and construe the disputed claim terms as described above. The Court will issue an Order consistent with this Memorandum Opinion.